TETRA TECH

John Craig
Vice President

February 15, 2012

Ms. Shana Budd
GSA, FAS, (8Q)
Denver Federal Center, Bldg 41
P.O. Box 25526
Denver, CO 80225-0526

Subject: BPA 08RT0049, Task Order 19 — Revision 1

Dear Ms. Budd:

Attached for your review is a Revised Work Plan for Task Order 19 including a cost estimate based on the revised statement of work, received February 9, 2012.

No changes are required to our Firm Fixed Price bid.

Total Cost: $694,895

If you require additional information, please contact me at (703) 385-6000, extension 373.

Sincerely,

John Craig
Vice President

Submitted electronically with electronic CCs to:

Lisa Kusnierz
Danette Quick
Marlene Florman
Kevin Kratt
Elisabeth Krebs

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Technical Assistance to EPA for 2011 and 2012 Montana TMDL Support

BPA 08RT0049

Technical Response to Task Order 19, Revision 1

Submitted to:
GSA, FAS, (8Q)
Denver Federal Center, Bldg 41, Rm 145
P.O. Box 25526
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Submitted by:
Tetra Tech
1468 W. 9th Street, Suite 620
Cleveland, OH 44113

February 15, 2012

Introduction

EPA is under court order to complete TMDLs for 664 waterbody-pollutant combinations by December 31, 2014. Several of the waterbodies need additional data collected before TMDLs can be completed, and other waterbodies have sufficient data for completion of TMDLs. The purpose of this task order is to collect data, complete modeling projects, and draft TMDL documents to complete TMDLs by the 2014 deadline and assist with meeting the terms of the court order.

Section I. Work Plan Tasks

Tt and our subcontractor, ATKINS, will provide support to EPA Region 8 by completing the tasks identified below.

Task 1: Project Planning, Support, and Communications

Task 1a - Scoping Conference Call

Within 14 calendar days of task order issuance by the GSA Contracting Officer (CO), Tt will convene a scoping conference call with the EPA TOM to discuss the project including schedule, communication, analyses, and deliverables. Participants will include Kevin Kratt, Jennifer Olson, Gary Ingman, Jeff Dunn, John DeArment, and Erich Weber. Tt will provide brief meeting minutes to the EPA TOM in writing and by e-mail within 5 business days of the scoping meeting.

Task 1a Deliverables: Project scoping conference call and meeting minutes.

Task 1b – Progress Briefings

During the time period when field sampling activities are ongoing, the ATKINS local liaison (Gary Ingman) will provide the EPA TOM with weekly verbal reports in which the previous week's activities are summarized and the following week's plans are discussed. To ensure that the EPA TOM is adequately informed to coordinate with the public and watershed stakeholders, the ATKINS local liaison will keep the EPA Project Manager informed at all times if and when ATKINS staff are working in the field.

During time periods when field sampling activities are not ongoing, the ATKINS local liaison will provide the EPA TOM with biweekly progress briefings, by telephone or by email, and telephone briefings at least once per month, at a mutually agreed upon time. The ATKINS local liaison will arrange for monthly conference calls with the EPA TOM.

All verbal reports shall be documented in the subsequent written report produced under task 1c.

Task 1b Deliverables: Monitoring event written activity summary reports, weekly or bi-weekly activity reports, monthly conference calls.

Task 1c – Monthly Progress Reports

Beginning the 1st of the month after the scoping conference call outlined in Task 1a, Tt will provide the EPA TOM with a monthly project status report via e-mail until project completion. The EPA TOM's e-mail address is: kusnierz.lisa@epa.gov.

The monthly report will provide the following information:

- Project status (e.g., update on task/subtask level)
- Accomplishments made during the month
- Impediments encountered/corrective actions taken

Task 2: Monitoring for TMDL Development

Task 2a: Develop and Implement a Sampling and Analysis Plan for the Fisher, Kootenai, Lower Flathead and Thompson TMDL Planning Areas

ATKINS will develop a combined Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) for monitoring in the Fisher, Kootenai, Lower Flathead and Thompson TMDL Planning Areas. The SAP and QAPP must be approved by EPA prior to conducting any sampling events.

Monitoring will be conducted for the stream segments specified in Table 1. ATKINS will determine where to locate monitoring stations. Monitoring locations will be based on the following:

- Ability to bracket known sources (i.e., upstream and downstream of abandoned mines, etc.)
- Previous monitoring at the site by federal or state agencies.
- Site access (contractor shall contact all relevant landowners to obtain permission for sampling at all sites. Alternate sites may be needed if access is denied).

Final site selection will be approved by EPA as part of the SAP/QAPP approval process. The total number of stations per segment is specified in Table 2. However, ATKINS staff may recommend adding or deleting sites based on the source and site access analysis.

Table 1. Location of the impaired segments in the Fisher, Kootenai, Lower Flathead and Thompson TMDL Planning Areas.

TPA	Stream	List ID	Pollutant	CFL
Fisher	FISHER RIVER, the Silver Butte/Pleasant Valley junction to mouth (Kootenai River)	MT76C001_010	Lead	2000
Fisher	RAVEN CREEK, headwaters to mouth (Pleasant Valley Fisher River)	MT76C001_030	Nitrate/Nitrite (Nitrite + Nitrate as N)	2006
Fisher	RAVEN CREEK, headwaters to mouth (Pleasant Valley Fisher River)	MT76C001_030	Phosphorus (Total)	2006
Fisher	RAVEN CREEK, headwaters to mouth (Pleasant Valley Fisher River)	MT76C001_030	Total Kjeldahl Nitrogen (TKN)	2006
Kootenai	BIG CHERRY CREEK, Snowshoe Creek to Mouth (Libby Creek)	MT76D002_050	Zinc	1988
Kootenai	BRISTOW CREEK, the headwaters to mouth at Lake Koocanusa	MT76D002_110	Total Kjeldahl Nitrogen (TKN)	2000
Kootenai	LAKE CREEK, Bull Lake outlet to mouth (Kootenai River)	MT76D002_070	Cadmium	1992
Kootenai	LAKE CREEK, Bull Lake outlet to mouth (Kootenai River)	MT76D002_070	Copper	1992
Kootenai	LAKE CREEK, Bull Lake outlet to mouth (Kootenai River)	MT76D002_070	Lead	1992
Kootenai	LAKE CREEK, Bull Lake outlet to mouth (Kootenai River)	MT76D002_070	Mercury in Water Column	1992
Kootenai	LAKE CREEK, Bull Lake outlet to mouth (Kootenai River)	MT76D002_070	Nitrate/Nitrite (Nitrite + Nitrate as N)	2000
Kootenai	LAKE CREEK, Bull Lake outlet to mouth (Kootenai River)	MT76D002_070	Zinc	1992
Kootenai	LIBBY CREEK, from 1 mi above Howard Creek to highway 2 bridge	MT76D002_061	Mercury	1996

TPA	Stream	List ID	Pollutant	CFL
Kootenai	SNOWSHOE CREEK, Cabinet Wilderness boundary to mouth (Big Cherry Creek)	MT76D002_040	Cadmium	1988
Kootenai	SNOWSHOE CREEK, Cabinet Wilderness boundary to mouth (Big Cherry Creek)	MT76D002_040	Zinc	1988
Kootenai	STANLEY CREEK, headwater to confluence with Fairway Creek	MT76D002_010	Copper	1988
Kootenai	STANLEY CREEK, headwater to confluence with Fairway Creek	MT76D002_010	Nutrient/Eutrophication Biological Indicators	2000
Lower Flathead	LITTLE BITTERROOT RIVER, Hubbart Reservoir to Flathead Reservation Boundary	MT76L002_060	Nitrate/Nitrite (Nitrite + Nitrate as N)	1988
Lower Flathead	LITTLE BITTERROOT RIVER, Hubbart Reservoir to Flathead Reservation Boundary	MT76L002_060	Phosphorus (Total)	1988
Lower Flathead	LITTLE BITTERROOT RIVER, Hubbart Reservoir to Flathead Reservation Boundary	MT76L002_060	Total Kjeldahl Nitrogen (TKN)	1988
Lower Flathead	SULLIVAN CREEK, headwaters to Flathead Indian Reservation	MT76L002_070	Aluminum	2006
Lower Flathead	SULLIVAN CREEK, headwaters to Flathead Indian Reservation	MT76L002_070	Cadmium	2006
Lower Flathead	SULLIVAN CREEK, headwaters to Flathead Indian Reservation	MT76L002_070	Phosphorus (Total)	1988
Lower Flathead	SULLIVAN CREEK, headwaters to Flathead Indian Reservation	MT76L002_070	Zinc	2006
Thompson	LAZIER CREEK, headwaters to mouth (Thompson River)	MT76N005_060	Nitrate/Nitrite (Nitrite + Nitrate as N)	2006
Thompson	LAZIER CREEK, headwaters to mouth (Thompson River)	MT76N005_060	Phosphorus (Total)	2006
Thompson	LAZIER CREEK, headwaters to mouth (Thompson River)	MT76N005_060	Total Kjeldahl Nitrogen (TKN)	2006
Thompson	LITTLE THOMPSON RIVER, headwaters to mouth (Thompson River), T22N R25W S8	MT76N005_040	Phosphorus (Total)	2006
Thompson	MCGINNIS CREEK, headwaters to mouth (Little Thompson River)	MT76N005_070	Phosphorus (Total)	2006
Thompson	McGREGOR CREEK, McGregor Lake to mouth (Thompson River)	MT76N005_030	Phosphorus (Total)	2006

Table 2. Impaired segments and number of monitoring stations for the Fisher, Kootenai, Lower Flathead and Thompson TMDL Planning Areas.

Stream	Segment ID	Stream Miles	# of Stations	Metals	Nutrients
FISHER RIVER, the Silver Butte/Pleasant Valley junction to mouth (Kootenai River)	MT76C001_010	33.8	5	X	
RAVEN CREEK, headwaters to mouth (Pleasant Valley Fisher River)	MT76C001_030	3.0	3		X
BIG CHERRY CREEK, Snowshoe Creek to Mouth (Libby Creek)	MT76D002_050	13.1	4	X	
BRISTOW CREEK, the headwaters to mouth at Lake Koocanusa	MT76D002_110	6.4	4		X
LAKE CREEK, Bull Lake outlet to mouth (Kootenai River)	MT76D002_070	17.6	6	X	X
LIBBY CREEK, from 1 mi above Howard Creek to highway 2 bridge	MT76D002_061	11.2	3	X	
SNOWSHOE CREEK, Cabinet Wilderness boundary to mouth (Big Cherry Creek)	MT76D002_040	3.6	3	X	

Stream	Segment ID	Stream Miles	# of Stations	Metals	Nutrients
STANLEY CREEK, headwater to confluence with Fairway Creek	MT76D002_010	4.0	3	X	X
LITTLE BITTERROOT RIVER, Hubbart Reservoir to Flathead Reservation Boundary	MT76L002_060	5.2	4		X
SULLIVAN CREEK, headwaters to Flathead Indian Reservation	MT76L002_070	3.9	3	X	X
LAZIER CREEK, headwaters to mouth (Thompson River)	MT76N005_060	7.8	4		X
LITTLE THOMPSON RIVER, headwaters to mouth (Thompson River), T22N R25W S8	MT76N005_040	19.9	5		X
MCGINNIS CREEK, headwaters to mouth (Little Thompson River)	MT76N005_070	5.1	4		X
McGREGOR CREEK, McGregor Lake to mouth (Thompson River)	MT76N005_030	6.8	4		X

Synoptic sampling for nutrients will be conducted during three sampling events: one during summer 2011 low flow conditions and two during summer 2012 low flow conditions (Table 3). Chlorophyll *a* sampling will be done in conjunction with nutrient sampling during one sampling event each year. Algae will only be collected for chlorophyll *a* analysis at each site where algal density is visually estimated to be close to or greater than 50 mg/m^2.

Synoptic sampling for metals will be conducted during three sampling events: one during summer 2011 low flow conditions, one during spring 2012 high flow conditions, and one during summer 2012 low flow conditions (Table 3). Sediment samples will be collected and analyzed for metals (same parameters as for water samples) during the summer 2012 sampling event. Sediment metals samples will be shipped refrigerated from the field to the laboratory for prompt sieving (in the laboratory) and analysis. Total suspended solids (TSS) will be collected at all sites during all sampling events. Physical parameters (i.e. water temperature, dissolved oxygen, pH, and conductivity) will be collected with a field meter at all sites. Table 4 summarizes the parameters that will be sampled for each impairment category (i.e., metals and nutrients). Sampling protocols will generally follow Montana DEQ's standard operating procedures (2011 revisions).

Table 3. Sampling timeframe for nutrients and metals.

Sampling Event	Nutrients	Chlorophyll	Metals	Sediment Metals
August 2011	X	X	X	
May/June 2012			X	
August/September 2012	XX	X	X	X

Table 4. Monitoring parameters for impaired streams.

Impairment Category	Data Type	Parameters
Metals	Laboratory (all metals data will be analyzed as Total Recoverable, except for aluminum)	Aluminum (dissolved), Arsenic, Cadmium, Chromium, Copper, Iron, Lead, *Mercury (low level), Nickel, Selenium, Silver, Zinc, Hardness, TSS
	Field	pH, specific conductance, water temperature, dissolved oxygen, flow
Nutrients	Laboratory	Total Phosphorus, Total Nitrogen (persulfate method), Nitrate + Nitrite, TSS, chlorophyll *a*/AFDW
	Field	pH, specific conductance, water temperature, dissolved oxygen, flow

*Low-level mercury will only be analyzed on Lake and Libby creeks.

Task 2b: Data Formatting, Quality Control, and WQX Upload

ATKINS will apply all quality assurance/quality control (QA/QC) measures to the laboratory and field data following the specifications outlined in the QAPP. QA/QC measures will be verified with EPA and DEQ quality assurance project officers prior to submittal of the data. Laboratory and field data will be submitted to EPA and DEQ in a Montana DEQ EQUIS-ready spreadsheet, and uploaded to EQUIS for final submittal.

Task 3: Lake Helena Monitoring

Monitoring in streams in the Lake Helena watershed from 2010 indicated that several of the 303(d) listed segments do not appear to be impaired (i.e., metals water quality concentrations were lower than water quality standards). The purpose of Task 7 is to collect additional metals water chemistry data in 2012 to provide sufficient credible data (SCD) and allow the Montana DEQ assessment team to delist waterbodies, where appropriate.

ATKINS will update the Task Order 15 SAP/QAPP to include monitoring in 14 waterbodies in the Lake Helena watershed in 2012. The SAP and QAPP must be approved by EPA prior to conducting any sampling events.

Monitoring will be conducted for the stream segments specified in Table 8. In consultation with EPA, Tt and ATKINS will determine where to locate monitoring stations. Monitoring locations will be based on the following:

- Ability to bracket known sources (i.e., upstream and downstream of treatment plants, abandoned mines, etc.)
- Ability to determine a reference/least impacted segment
- Previous monitoring at the site by federal or state agencies.
- Site access (ATKINS will contact all relevant landowners to obtain permission for sampling at all sites. Alternate sites may be needed if access is denied).

Final site selection will be approved by EPA as part of the SAP/QAPP approval process. The total number of stations (sites) is specified in Table 5. However, ATKINS staff may recommend adding or deleting sites based on the source and site access analysis.

Table 5. Stream segments and corresponding samples required in 2012.

Segment	Segment ID	Stream Miles	Listed Parameters	Sites	Visits
CLANCY CREEK	MT41I006_120	11.6	Hg	3	2
CORBIN CREEK	MT41I006_090	2.5	Ag	2	4
GOLCONDA CREEK	MT41I006_070	3.7	Cu, Zn	3	2
GRANITE CREEK	MT41I006_230	2.5	As, Cd	2	4
JACKSON CREEK	MT41I006_190	2.5	Zn	2	3
LUMP GULCH	MT41I006_130	14.5	Hg	3	2
MIDDLE FORK WARM SPRINGS CREEK	MT41I006_100	2.7	Cu, Hg	2	4
PRICKLY PEAR CREEK	MT41I006_040	10.6	Al, Sb	3	2

Segment	Segment ID	Stream Miles	Listed Parameters	Sites	Visits
PRICKLY PEAR CREEK	MT41I006_050	7	As, Cu	2	1
PRICKLY PEAR CREEK	MT41I006_060	8.8	Cd	2	2
SKELLY GULCH	MT41I006_220	7.7	As	2	3
SPRING CREEK	MT41I006_080	1.7	Al, Hg, Ag	2	4
TENMILE CREEK	MT41I006_141	6.7	Hg	4	2
TENMILE CREEK	MT41I006_143	16.4	Hg	3	2

Sampling will be conducted once for each of the 14 stream segments during spring 2012 high flow conditions (i.e., April 15th – June 30th) and up to three additional times during low flow conditions. Low flow site visits must be 30 days apart. A total of 88 samples will be collected (not including blanks or duplicates). Only the metals listed for a particular stream segment will be sampled. Field parameters identified in Table 6 will be sampled at every site. Sampling protocols will follow Montana DEQ's standard operating procedures (SOPs).

Table 6. Field monitoring parameters.

Data Type	Parameters
Field	pH, specific conductance, water temperature, dissolved oxygen, flow

ATKINS will apply all quality assurance/quality control (QA/QC) measures to the laboratory and field data following the specifications outlined in the project QAPP. A written summary of data quality will be prepared following review of field documentation and data received from the laboratory. The data quality analysis will summarize the QA/QC information from the field event and laboratory analysis (including QC sample results), audit information, corrective actions taken (if any), and the overall results of sampling and analytical activities with respect to compliance with the provisions of this QAPP.

ATKINS will submit associated field forms and site access notes (including a site map) to the project manager upon the completion of this task. QA/QC measures and the written summary must be approved by EPA and DEQ quality assurance project officers prior to submittal of the data. Laboratory and field data will be submitted to EPA and DEQ in a Montana DEQ EQuIS-ready spreadsheet, and uploaded to EQuIS for final submittal.

Task 4: Temperature TMDLs

The purpose of this task is to collect additional temperature data needed for TMDL completion in the waterbody segments and complete temperature modeling for waterbodies as identified in Table 7.

Table 7. Waterbody segments listed for temperature impairment to be addressed by Task 4.

TMDL Planning Area	Segment ID	Waterbody Name	Approach	Sampling Required	Modeling - Existing Condition	Modeling - Scenarios	Model Report
Fisher	MT76C001_020	WOLF CREEK, headwaters to mouth (Fisher River)	Complex QUAL2K	X	X	X	X
Middle Clark Fork Tributaries	MT76M002_090	PETTY CREEK, headwaters to mouth (Clark Fork River)	Complex QUAL2K	X	X	X	X
Middle Clark Fork Tributaries	MT76N003_010	LYNCH CREEK, headwaters to mouth (Clark Fork River)	Complex QUAL2K	X	X	X	X
Rock	MT76E002_020	EAST FORK ROCK CREEK, East Fork Reservoir to mouth (Middle Fork Rock Creek)	Complex QUAL2K		X	X	X
Rock	MT76E002_060	SOUTH FORK ANTELOPE CREEK, headwaters to mouth (Antelope Creek), T6N R15W S22	Complex QUAL2K		X	X	X
Tobacco	MT76D004_020	FORTINE CREEK, headwaters to mouth (Graves Creek)	Complex QUAL2K	X	X	X	X

Task 4a: Compile Available Temperature Data

Tt will compile all of the relevant water quality data for each waterbody (e.g. temperature, flow, shade/riparian health, channel morphology, irrigation withdrawals/returns), summarize the data, and identify data that will be used for model development as well as data gaps and data quality issues.

Task 4b: Temperature Data Collection

ATKINS will use the template from Task Order 18 to develop and implement a combined SAP/QAPP for deploying temperature data loggers in the four stream segments indicated in Table 7. The SAP/QAPP must be approved by EPA prior to conducting any sampling events.

The temperature data loggers will be set to record stream temperatures at 30-minute intervals starting in June 2012 and continuing through September 2012. It is estimated that 6-10 data loggers will be needed per waterbody segment, depending on length. EPA will provide the required temperature data loggers. In consultation with the EPA/DEQ project manager, Tt and ATKINS staff will identify sites for deployment based on the following:

- Ability to bracket known sources (e.g., upstream /downstream of tributaries/inputs, etc.)
- Ability to determine a reference/least impacted segment
- Previous monitoring at the site by federal or state agencies.
- Coordination with other monitoring gages (e.g., USGS daily/hourly monitoring sites)
- Site access and site suitability (ATKINS will contact all relevant landowners to obtain permission for sampling at all sites).

Site selection will be approved by EPA before deploying the data loggers, and site selection and data logger deployment will follow Montana DEQ SOPs. Flow and shade data must also be collected during deployment and retrieval and will be done according to DEQ SOPs. ATKINS understands that, in some cases, data logger site selection may fall outside of the impaired segment (in an upstream or downstream segment).

For modeling calibration purposes, ATKINS will visit each data logger once during summer low flows between deployment and retrieval (August 2012). Flows will be obtained at each site, along with field measurements of stream temperature, air temperature, specific conductance, and pH.

ATKINS will apply all QA/QC measures to field data following the specifications outlined in the QAPP. QA/QC measures will be verified with EPA and DEQ quality assurance project officers prior to submittal of the data. A written summary of data quality will be prepared following review of field documentation and data received from the laboratory. The data quality analysis will summarize the QA/QC information from the field event and laboratory analysis (including QC sample results), audit information, corrective actions taken (if any), and the overall results of sampling and analytical activities with respect to compliance with the provisions of this QAPP.

Field data will be submitted to EPA and DEQ in a Montana DEQ EQuIS-ready spreadsheet, and uploaded to EQuIS for final submittal. Data from the temperature data loggers will have QA/QC measures applied (as outlined in the QAPP), and will be submitted to EPA in Microsoft Excel spreadsheets. All associated field forms and site access notes (including a site map) will be submitted to the project manager upon the completion of this task. QA/QC measures and the written summary must be approved by EPA and DEQ quality assurance project officers prior to submittal of the data.

Task 4c: Temperature Modeling

At a minimum, all recent flow and water temperature data compiled in Task 4a and/or collected in Task 4b will be utilized to form the basic input for a temperature water quality model for the segments identified in Table 7. Meteorological data requisite to operation of the model (i.e. hourly for QUAL2K) shall be compiled and include such things as air temperature, wind speed, relative humidity, and cloud cover. These data shall be compiled from the most proximal FAA, RAWS, or Agrimet station. Several pre-processing steps are necessary to format continuous air and water temperature data such that appropriate comparisons can be made between simulated and observed values. Data aggregation details shall be discussed with EPA prior to completion, and will be completed over a period no less than that of the travel time of the reach being modeled. Hydraulic reaches in the model will be segmented as necessary, with breaks for aspect or vegetation changes (for shading purposes), flow changes, or any other characteristic necessary for proper representation of the stream corridor. These will be coordinated with and agreed upon by EPA prior to completing the modeling analyses. Following definition of model hydrology and hydraulics, water temperature shall be calibrated and validated using observed data when applicable.The use of model performance statistics will be discussed with EPA/DEQ prior to project implementation, and at a minimum, will include assessment of percent bias for calculated minimums, maximums, and mean temperatures at each model calibration/validation node.

The overall strategy in the development of all modeling tools is to evaluate the relative influence of shade and water use on in-stream water temperature. Channel morphology should be incorporated if sufficient data are available and it appears to be a factor in the impairment. At a minimum, the modeling shall address compliance with the State temperature standard through the following scenarios: (1) existing conditions (which is merely a reflection of the calibration/validation), (2) natural condition scenario (e.g. all anthropogenic influence removed), (3) naturally occurring as defined by the State temperature standard, (4) water use scenario, and (5) a shade scenario. The needs for each scenario may differ slightly for each stream; prior to modeling, Tt will coordinate with the EPA/DEQ project manager to assure the appropriate scenarios are used. The combined use of these scenarios will help TMDL managers prioritize restoration improvement strategies in the watershed so that water quality standards can be attained and maintained. Model development, calibration and validation, and associated scenarios shall be documented in a final report that shall be of sufficient detail to describe the project procedures and associated results.

Deliverables:
1) A calibrated and validated temperature water quality model for each waterbody segment specified in Table 7 for the summer critical flow period (as specified by EPA)

2) A draft and final summary report that describes the details of the modeling (per Table 7). The report shall contain the following information at a minimum: (a) a description of the development of the applicable model including the data quality of inputs and associated sources, (b) model calibration-validation information including calculated statistics at each model node, (c) a list of modeling assumptions and justifications, and (d) results of the modeling scenarios. The report will be submitted as both hard copy and electronic and will include a review of all data collected during the effort and a review of the model calibration and modeling scenario methods and results. A data appendix for this document will be provided.

Task 4d: Quality Assurance Project Plan

Tt will update the TO 18 QAPP for temperature modeling to include modeling for those waterbodies listed in Table 7. The QAPP will follow the template and checklist provided by EPA, and will be submitted in MS Word format.

Task 5: Tobacco, Yaak, and Hyalite Watershed Nutrient Monitoring

Task 5a: Develop and Implement a Sampling and Analysis Plan for nutrient sampling in the Tobacco, Yaak, and Hyalite Watersheds

ATKINS shall develop a combined SAP and QAPP for monitoring in the Yaak, Tobacco, and Hyalite watersheds. ATKINS envisions that this document will be in the form of an addendum to the Task Order 19 SAP/QAPP developed under Task 3a described earlier. The SAP/QAPP must be approved by EPA prior to conducting any sampling events.

Monitoring will be conducted for the stream segments specified in Table 8. In consultation with the EPA/DEQ project manager, Tt and ATKINS shall determine where to locate monitoring stations. Monitoring locations will be based on the following:

- Ability to bracket known sources (i.e., upstream and downstream of abandoned mines, etc.)
- Previous monitoring at the site by federal or state agencies.
- Ability to determine a reference/least impacted segment
- Site access (contractor shall contact all relevant landowners to obtain permission for sampling at all sites. Alternate sites may be needed if access is denied).

Table 8. Nutrient impaired segments and their associated listings in the Tobacco, Yaak, and Hyalite watersheds.

TPA	Stream	List ID	Pollutant
Tobacco	LIME CREEK, headwaters to mouth (Fortine Creek)	MT76D004_050	Total Phosphorus, Total Kjehldahl Nitrogen
Yaak	EAST FORK YAAK RIVER, headwaters to mouth (Yaak River)	MT76B002_100	Nitrate/Nitrate
	WEST FORK YAAK RIVER, headwaters to mouth (Yaak River)	MT76B002_090	Nitrate/Nitrate
	PETE CREEK, headwaters to mouth (Yaak River)	MT76B002_070	Nitrate/Nitrate
	SPREAD CREEK, headwaters to mouth (Yaak River)	MT76B002_060	Nitrate/Nitrate
	LAP CREEK, headwaters to mouth (Yaak River)	MT76B002_020	Nitrate/Nitrate
	SEVENTEEN MILE CREEK, headwaters to mouth (Yaak River)	MT76B002_010	Nitrate/Nitrate

TPA	Stream	List ID	Pollutant
Lower Gallatin	HYALITE CREEK, headwaters to the top of Hyalite Reservoir, T4S R6E S23	MT41H003_129	Total Phosphorus, Total Kjehldahl Nitrogen
Lower Gallatin	HYALITE CREEK, Hyalite Reservoir to the Bozeman water supply diversion ditch, T3S R5E S23	MT41H003_130	Total Phosphorus, Total Kjehldahl Nitrogen

Final site selection will be approved by EPA as part of the SAP/QAPP approval process. The total number of stations per segment is specified in Table 9. However, Tt and ATKINS may recommend adding or deleting sites based on the source and site access analysis.

Table 9. Waterbody segment length and number of nutrient sample sites per segment.

TPA	Stream	List ID	Stream Miles	# of Sites
Tobacco	LIME CREEK, headwaters to mouth (Fortine Creek)	MT76D004_050	4.9	3
Yaak	EAST FORK YAAK RIVER, headwaters to mouth (Yaak River)	MT76B002_100	14.6	4
	WEST FORK YAAK RIVER, headwaters to mouth (Yaak River)	MT76B002_090	20.3	4
	PETE CREEK, headwaters to mouth (Yaak River)	MT76B002_070	10.94	4
	SPREAD CREEK, headwaters to mouth (Yaak River)	MT76B002_060	12.6	4
	LAP CREEK, headwaters to mouth (Yaak River)	MT76B002_020	4.77	4
	SEVENTEEN MILE CREEK, headwaters to mouth (Yaak River)	MT76B002_010	16.4	4
Lower Gallatin	HYALITE CREEK, headwaters to the top of Hyalite Reservoir, T4S R6E S23	MT41H003_129	7	4
Lower Gallatin	HYALITE CREEK, Hyalite Reservoir to the Bozeman water supply diversion ditch, T3S R5E S23	MT41H003_130	8.8	4

Synoptic sampling for nutrients (i.e. total phosphorus, total nitrogen, and nitrate + nitrite) will be conducted during two sampling events during summer 2012 low flow. Sampling will be conducted between July 1 and September 30, and sampling events will be conducted at least one month apart. Chlorophyll *a*/ash-free dry weight, periphyton, and macroinvertebrate sampling will be done in conjunction with nutrient sampling during one sampling event and conducted according to DEQ protocols, which include photo documentation of chlorophyll *a* (accessible at http://deq.mt.gov/wqinfo/qaprogram/sops.mcpx). Instantaneous flow will be measured for each site so that nutrient loads can be calculated. Total suspended solids (TSS) will be collected at all sites during all sampling events. Physical parameters (i.e. water temperature, air temperature, dissolved oxygen, pH, and conductivity) will be collected with a field meter at all sites.

Task 5b: Data Formatting, Quality Control, and WQX Upload

ATKINS will apply all QA/QC measures to the laboratory and field data following the specifications outlined in the QAPP. A written summary of data quality will be prepared following review of field documentation and data received from the laboratory. The data quality analysis will summarize the QA/QC information from the field event and laboratory analysis (including QC sample results), audit information, corrective actions taken (if any), and the overall results of sampling and analytical activities with respect to compliance with the provisions of this QAPP.

All associated field forms and site access notes (including a site map) will be submitted to the project manager upon the completion of this task. QA/QC measures and the written summary must be

approved by EPA and DEQ quality assurance project officers prior to submittal of the data. Laboratory and field data will be submitted to EPA and DEQ in a Montana DEQ EQuIS-ready spreadsheet, and uploaded to EQuIS for final submittal.

Task 6: Flathead Lake Watershed Sediment Loading

Seven waterbodies in the Flathead Lake watershed are listed as impaired due to sediment including Ashley Creek, Fish Creek, Logan Creek, Sheppard Creek, Stillwater River, Whitefish Lake, and Flathead Lake. In addition, Haskill Creek has not been listed as impaired but will be included in TMDL development. The DEQ is responsible for establishing TMDLs for the above streams/rivers, with watershed-scale modeling support from EPA. The basis for the sediment impairment listings for Flathead and Whitefish Lakes is not well documented. As a result, a plan for proceeding with TMDL development for these two lakes has not yet been developed. The objectives of this Task are to: 1) provide Flathead Lake Basin-scale technical assistance in support of TMDL development for the above listed streams/rivers and; 2) provide support for the development of a plan for either delisting the lakes (if further analysis suggests this is appropriate) or developing TMDLs (if further analysis confirms the impairments).

Task 6a: Flathead River Bank Erosion

Excessive bank erosion in the lower Flathead River (i.e., largely in the area influenced by Kerr Dam backwater effects) has been anecdotally linked to wave action and dam operation. Based on field reconnaissance visits by EPA and DEQ, the magnitude of erosion may be significant relative to the overall Flathead Lake Basin sediment budget. The purpose of this task will be to support the Flathead Lake Basin LSPC modeling effort by answering the following question:

> *What is the extent and magnitude of bank erosion in the mainstem Flathead River above Flathead Lake?*

Tt will review the available literature and make contacts with appropriate local/regional experts (e.g., Montana Fish, Wildlife and Parks, the Flathead Conservation District, and the Flathead Lake Biological Station) to compile the available data and information regarding the aerial extent and magnitude of bank erosion. Tt will then work with EPA and DEQ project team members and watershed stakeholders with knowledge or expertise specific to this topic, to develop and implement a simple method for estimating both the aerial extent and magnitude of bank erosion on the portion of the Flathead River influenced by Kerr Dam backwater effects. This task will be completed using only available data and information. Tt understands that complex approaches and/or field data collection are beyond the scope of this task order.

Deliverables:

1) A brief memorandum, for internal use by the EPA, DEQ, and Tt Flathead Modeling Team, will be prepared including a summary of the aerial extent of bank erosion on the portion of the Flathead River influenced by Kerr Dam backwater effects, and the proposed methods for estimating sediment/nutrient loads from bank erosion.
2) A detailed write-up of the results of bank erosion modeling will be included in the Flathead Lake Basin LSPC Model Report, under separate contract.

Task 6b: Shoreline Erosion

The purpose of this task is to provide technical support relative to the sediment impairment listings for Flathead and Whitefish Lakes and to answer the following question:

> *What is the extent and magnitude of shoreline erosion in Flathead and Whitefish Lakes?*

Tt will compile the available data and information including: 1) studies that may have been completed in an attempt to quantify the extent and magnitude of shoreline erosion; 2) data/information on the composition of shoreline substrates; and 3) data/information describing wave actions on either Flathead or Whitefish Lakes. Tt will then summarize this information in a brief summary report or memorandum. No field studies or data collection are proposed. This task will be based entirely on readily available data and information.

Deliverables:

1) Tt will summarize this information in a brief summary report or memorandum.

Task 6c: Dam Operations

The purpose of this task is to answer the following questions:

1. *What are historical, current, and proposed operational practices for Hungry Horse and Kerr Dams?*
2. *What are the sediment loads entering and exiting Hungry Horse Reservoir?*
3. *How are the operation of Hungry Horse and Kerr Dams affecting sediment dynamics?*

Tt will make the necessary contacts with dam operators including the Bureau of Reclamation, PPL Montana, and the Confederated Salish and Kootenai Tribe and agency personnel to compile all available information on the historic, current and proposed future operational practices for both Hungry Horse and Kerr Dams. Tt will also compile the available water quality data (with a focus on measures of sediment loading such as TSS or SSC). To the extent possible given the available data, current annual sediment loading to Hungry Horse Reservoir and sediment loading downstream of the dam will be estimated.

Deliverables:

1) Using the compiled data and information on dam operations, Tt will prepare a brief white paper describing the operational effects of dam operation on sediment dynamics in Flathead Lake.

Task 6d: Sediment TMDL Support Services

The goal of this task is to be able to verify the condition of suspended and bedload sediment concentrations and loading to the impaired streams using readily available data. Tt will compile and summarize sediment water chemistry data (i.e., TSS, sechhi depth, turbidity) as well as available channel morphology and riparian condition data not included within the Flathead-Stillwater TMDL Planning Area Sediment and Habitat Assessment Summary Report, March 15 2009 (i.e., BEHI erosion estimates, channel migrations studies, etc.) for the waterbodies listed in Table 10 (and Haskill Creek), as well as any other relevant data pertaining to tributaries and tributary sediment loading. In particular, available data for the Stillwater River will be reviewed for information that may be used to develop water quality targets since typical morphology, fines, and habitat targets will likely not apply given the size of this stream.

Deliverables:

1) Tt will provide summary tables with interpretation in a report submitted in MS Word format. Data compilation and reporting will be completed with review and feedback from DEQ sediment TMDL project manager.

Table 10. Sediment listed waters with the Flathead Lake Basin from the 2010 303(d) List

TMDL Planning Area	Waterbody ID	Waterbody Name, Location Description
Flathead - Stillwater	MT76P004_010	WHITEFISH LAKE
Flathead - Stillwater	MT76P001_050	SHEPPARD CREEK, headwaters to mouth (Griffin Creek-Logan Creek-Talley Lake)
Flathead - Stillwater	MT76P001_030	LOGAN CREEK, headwaters to mouth (Tally Lake)
Flathead - Stillwater	MT76P001_010	STILLWATER RIVER, Logan Creek to mouth
Flathead - Stillwater	MT76O002_050	FISH CREEK, headwaters to mouth (Ashley Lake)
Flathead - Stillwater	MT76O002_010	ASHLEY CREEK, Ashley Lake to Smith Lake
Flathead Lake	MT76O003_010	FLATHEAD LAKE

Task 6e: Modeled Sediment Loading

Tt will use the LSPC model under development in Task Order #8 to answer the following questions pertaining to all of the sediment impaired waterbodies in the Flathead Lake Basin (including Haskill Creek):

1. *What is the current total annual average sediment load?*
2. *What is the total annual "naturally occurring" average sediment load?*
3. *What are the sediment loads from the significant sources of sediment in the Flathead Lake Basin?*

Potentially significant sediment sources to quantify, either directly or indirectly through the LSPC model include: bank erosion, roads, forest harvest/fire, cropland, grazing/pasture, stormwater runoff, point sources, and natural sources.

Tt understands that EPA, in consultation with DEQ, will provide the necessary direction to define the "naturally occurring" model scenario.

Deliverables:
Upon completion of modeling under Task Order #8 (or subsequent contracts/task orders), Tt will compile the results into a stand-alone report that will be used by DEQ for TMDL development purposes.

Task 6f: Flathead and Whitefish Lake Sediment Impairments

The purpose of this task is to answer the following two questions:

1. *Based on the general literature, how might fish/aquatic life and recreational uses be impaired by excessive in-lake sediment?*
2. *What do available in-lake data suggest relative to aquatic life and recreational sediment impairment in Flathead and Whitefish Lakes.*

Tt will compile the available literature and consult with limnologists/aquatic ecologists to develop an understanding of the potential fish and aquatic life impacts that may occur due to excessive levels of in-

lake sediment in oligotrophic lakes with characteristics similar to Flathead and Whitefish Lakes. Tt will also compile all available water-column water chemistry and physical data (e.g., sechhi depth, turbidity, TSS, SSC, etc.), and bottom substrate data/information (e.g., reports relating to sediment deposition rate, etc.) that may inform potential sediment impairments in Flathead and Whitefish Lakes. Recreation uses and associated potential impairments by sediment will also be considered.

Deliverables:

1) A white paper will be prepared summarizing the literature, the available data, and discussing the available data relative to potential sediment impairment.

Schedule

The period of performance for this task order is until June 2, 2013. A task schedule is presented in Table 11.

Table 11. Schedule of key deliverables

Task	Task Initiation Timeframe	Completion Timeframe
Task 1a - Scoping Conference Call	Within 14 days of TO award	Within 5 days of conference call
Task 1b - Progress Briefings	• Within 5 business days of the completion of any of the monitoring events. • Weekly verbal reports during the time period when field sampling activities are ongoing. • Biweekly progress briefings during time periods when field sampling activities are not ongoing.	Ongoing for duration of the project.
Task 1c – Monthly Progress Report	Within 7 days of end of month	Ongoing for duration of the project.
Task 1d – Community Involvement/Meeting Support	After completion of the scoping conference call	Ongoing for duration of the project.
Task 2 – Monitoring for TMDL Development	After completion of the scoping conference call	November 30, 2012
Task 3 – Lake Helena Monitoring	After completion of the scoping conference call	December 31, 2012
Task 4 – Temperature TMDLs	After completion of the scoping conference call	December 31, 2012
Task 5 – Tobacco, Yaak, and Hyalite Watershed Nutrient Monitoring	After completion of the scoping conference call	December 31, 2012
Task 6 – Flathead Lake Watershed Sediment Loading	After completion of the scoping conference call	June 2, 2013 [a]

a. The schedule for Task 6e is dependent upon completion of tasks under separate contract

Section II. Personnel

For this Task Order, Tt will mobilize a team of highly trained and experienced staff to provide support to EPA on the activities identified in the SOW. Tt will administer all work conducted under this Task Order from its Cleveland, OH, Water Resources Center. This office will work collaboratively with staff from Jackson, WY; Fairfax, VA; Research Triangle Park, NC; and Seattle, WA. Personnel that will be key to the successful execution of this Task Order are Ron Steg, Jennifer Olson, Kevin Kratt, Bruce Cleland, Yoichi Matsuzuru, Sen Bai, John Riverson, Jon Butcher, Bill Carlson, and Elizabeth Hanson. Gary

Ingman will serve as ATKINS project manager. These key staff will be supported by additional scientists, modelers, and outreach specialists.

Section III. Price

This section provides the data and information for pricing the technical support to be provided under this Task Order. Tt proposes to perform this Task Order on a Firm Fixed Price basis. Invoices will be submitted monthly in accordance with Tt's 12 accounting periods each year and will be based upon dividing the Task Order budget by the number of accounting periods.

The attached cost estimate table provides Tt's overall cost summary for providing the support outlined in the SOW listed by task. The labor cost estimates are based on the approved Fixed Price labor rates provided in Tt's GSA Federal Supply Schedule Contract Number GS-10F-0268K (Environmental Compliance Services).

TO19 Cost Estimate, R1

Bid Categories	Rate	1. Project Mgt Hours	1. Project Mgt Dollars	2. Monitoring Hours	2. Monitoring Dollars	3. L. Helena Monitoring Hours	3. L. Helena Monitoring Dollars	4. Temperature TMDLs Hours	4. Temperature TMDLs Dollars	5. Nutrient Monitoring Hours	5. Nutrient Monitoring Dollars	6. Flathead Hours	6. Flathead Dollars	Total Hours	Total Dollars
Project Manager	$152.23	20	$ 3,045	24	$ 3,654	12	$ 1,827	12	$ 1,827	16	$ 2,436	32	$ 4,871	116	$ 17,659
Principal Scientist / Engineer	$142.13	40	$ 5,685	16	$ 2,274	60	$ 8,528	231	$ 32,832	12	$ 1,706	260	$ 36,954	619	$ 87,978
Scientist / Engineer C	$110.88	76	$ 8,427	80	$ 8,870	20	$ 2,218	815	$ 90,367	-	$ -	80	$ 8,870	1,071	$ 118,752
Scientist / Engineer B	$87.45	18	$ 1,574		$ -	-	$ -	42	$ 3,673	54	$ 4,722	-	$ -	114	$ 9,969
Scientist / Engineer A	$67.26	-	$ -	40	$ 2,690	10	$ 673	440	$ 29,594	-	$ -	362	$ 24,348	852	$ 57,306
Technical Editor	$94.37	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -	20	$ 1,887	20	$ 1,887
Contract Specialist	$87.39	27	$ 2,360	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -	27	$ 2,360
Labor Total		181	$ 21,090	160	$ 17,488	102	$ 13,245	1,540	$ 158,293	82	$ 8,864	754	$ 76,931	2,819	$ 295,911
ODCs	Unit Price	Quantity	Dollars	Quantity	Dollars			Quantity	Dollars	Quantity	Dollars	Quantity	Dollars	**Quantity**	**Dollars**
Travel															
Lodging	$77.00	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -	4	$ 308	4	$ 308
Per Diem	$46.00	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -	4	$ 184	4	$ 184
Rental Car (days)	$50.00	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -	4	$ 200	4	$ 200
Local (mileage)	$0.435	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -	800	$ 348	800	$ 348
Computer Usage	$ 1.61	181	$ 291	160	$ 258	102	$ 164	1,540	$ 2,479	82	$ 132	754	$ 1,214	2,819	$ 4,539
FedEx	$ 5.92	4	$ 24	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -	4	$ 24
Reproduction	$ 0.05	40	$ 2	-	$ -	-	$ -	400	$ 20	-	$ -	500	$ 25	940	$ 47
Total ODCs		-	$ 317	-	$ 258	-	$ 164	-	$ 2,499		$ 132		$ 2,279		$ 5,649
ATKINS		-	$ 7,420	-	$184,020	-	$ 57,222	-	$ 37,085	-	$ 107,587	-	$ -	-	$ 393,334
Total (Labor+ODCs+Subcontractor)		**181**	**$ 28,827**	**160**	**$201,766**	**102**	**$ 70,631**	**1,540**	**$ 197,878**	**82**	**$ 116,583**	**754**	**$ 79,210**	**2,819**	**$ 694,895**

Current TO 19 Budget $ 694,895

Difference $ 0

Task Order 19 Rescoping

Atkins Cost Proposal - January 13, 2012

Task 1. Project Planning, Support and Communications	**Staff**	**Units**	**Unit Cost**	**Cost**
Sub-Task 1a - Scoping Conference Call	Env. Project Manager	2	$125.00	$250.00
Sub-Task 1a - Scoping Conference Call	Sr. Env. Scientist I	2	$85.00	$170.00
Sub-Task 1b - Progress Briefings	Env. Project Manager	24	$125.00	$3,000.00
Sub-Task 1c - Monthly Progress Reports	Env. Project Manager	32	$125.00	$4,000.00
Task 1 Total				**$7,420.00**
Task 3. Monitoring for TMDL Development				
Task 3a. Develop and Implement a SAP for the Fisher, Kootenai, Lower Flathead and Thompson TPAs	**Staff**	**Units**	**Unit Cost**	**Cost**
Develop draft and final SAP documents	Sr. Env. Scientist I	60	$85.00	$5,100.00
Develop GIS SAP and field maps	Sr. GIS Analyst I	24	$85.00	$2,040.00
Site selections planning	Sr. Env. Scientist I	24	$85.00	$2,040.00
Make landowner contacts for access permission	Sr. Env. Scientist I	8	$85.00	$680.00
Monitoring preparations	Sr. Env. Scientist I	60	$85.00	$5,100.00
Conduct field monitoring - field crew member 1	Sr. Env. Scientist I	500	$85.00	$42,500.00
Conduct field monitoring - field crew member 2	Sr. Env. Scientist II	500	$125.00	$62,500.00
Vehicle mileage		7000	$0.55	$3,850.00
Lodging		80	$85.00	$6,800.00
Per diem		90	$29.00	$2,610.00
Lab analysis (incl. QA/QC samples)	Energy Labs @ cost	1	$36,500.00	$36,500.00
Field supplies and materials		1	$2,500.00	$2,500.00
Administrative support	Tech. Aide II	16	$50.00	$800.00
Task 3a Subtotal				**$173,020.00**
Task 3b. Data Formatting, Quality Control, and WQX	**Staff**	**Units**	**Unit Cost**	**Cost**
Data QA/QC review	Sr. Env. Scientist I	60	$85.00	$5,100.00
Data formatting & upload	Sr. Env. Scientist I	60	$85.00	$5,100.00
Administrative support	Tech. Aide II	16	$50.00	$800.00
Task 3b Subtotal				**$11,000.00**
Task 3 TOTAL				**$184,020.00**
Task 7. Lake Helena Monitoring				
Task 7a. Develop & Implement a SAP for the Lake Helena TPA	**Staff**	**Units**	**Unit Cost**	**Cost**
Develop draft and final SAP documents	Sr. Env. Scientist I	40	$85.00	$3,400.00
Develop GIS SAP and field maps	Sr. GIS Analyst I	8	$85.00	$680.00
Site selections planning	Sr. Env. Scientist I	4	$85.00	$340.00
Make landowner contacts for access permission	Sr. Env. Scientist I	4	$85.00	$340.00
Monitoring preparations	Sr. Env. Scientist I	40	$85.00	$3,400.00
Conduct field monitoring - field crew member 1	Sr. Env. Scientist I	126	$85.00	$10,710.00
Conduct field monitoring - field crew member 2	Sr. Env. Scientist II	176	$125.00	$22,000.00
Vehicle mileage		750	$0.55	$412.50
Per diem		60	$12.00	$720.00
Lab analysis (incl. QA/QC samples)	Energy Labs @ cost	1	$6,320.00	$6,320.00
Field supplies and materials		1	$500.00	$500.00
Administrative support	Tech. Aide II	16	$50.00	$800.00
Task 7a Subtotal				**$49,622.50**
Task 7b. Data Formatting, Quality Control, and WQX	**Staff**	**Units**	**Unit Cost**	**Cost**
Data QA/QC review	Sr. Env. Scientist I	40	$85.00	$3,400.00
Data formatting & upload	Sr. Env. Scientist I	40	$85.00	$3,400.00
Administrative support	Tech. Aide II	16	$50.00	$800.00
Task 7b Subtotal				**$7,600.00**
Task 7 TOTAL				**$57,222.50**
Task 8 Temperature TMDLs				
Task 8b Temperature Data Collection	**Staff**	**Units**	**Unit Cost**	**Cost**
Develop draft & final SAP documents	Sr. Env. Scientist 1	40	$85.00	$3,400.00
Develop GIS SAP and field maps	Sr. GIS Analyst I	16	$85.00	$1,360.00
Make landowner contacts for access permission	Sr. Env. Scientist 1	8	$85.00	$680.00

Field preparations, thermograph calibrations and setup	Sr. Env. Scientist 1	16	$85.00	$1,360.00
Deploy 40 thermographs, gauge flows, site documentation	Sr. Env. Scientist 1	0	$85.00	$0.00
Deploy 40 thermographs, gauge flows, site documentation	Sr. Env. Scientist II	40	$125.00	$5,000.00
Summer low-flow field data collection at 40 sites	Sr. Env. Scientist 1	40	$85.00	$3,400.00
Summer low-flow field data collection at 40 sites	Sr. Env. Scientist II	40	$125.00	$5,000.00
Retrieve 40 thermographs, gauge flows, shade data collection	Sr. Env. Scientist 1	40	$85.00	$3,400.00
Retrieve 40 thermographs, gauge flows, shade data collection	Sr. Env. Scientist II	40	$125.00	$5,000.00
Vehicle mileage		2500	$0.55	$1,375.00
Lodging		24	$85.00	$2,040.00
Per Diem		30	$29.00	$870.00
Data QA/QC review	Sr. Env. Scientist 1	24	$85.00	$2,040.00
Data formatting & deliverables	Sr. Env. Scientist 1	16	$85.00	$1,360.00
Administrative support	Tech. Aide II	16	$50.00	$800.00
Task 8b Subtotal				**$37,085.00**
Task 8 TOTAL				**$37,085.00**
Task 9. Tobacco and Yaak TPA Nutrient Monitoring				
Task 9a. Develop & Implement a SAP for the Tobacco and Yaak TPAs	**Staff**	**Units**	**Unit Cost**	**Cost**
Develop draft and final SAP documents	Sr. Env. Scientist I	40	$85.00	$3,400.00
Develop GIS SAP and field maps	Sr. GIS Analyst I	16	$85.00	$1,360.00
Site selections planning	Sr. Env. Scientist I	24	$85.00	$2,040.00
Make landowner contacts for access permission	Sr. Env. Scientist I	8	$85.00	$680.00
Monitoring preparations	Sr. Env. Scientist I	24	$85.00	$2,040.00
Conduct field monitoring - field crew member 1	Sr. Env. Scientist I	224	$85.00	$19,040.00
Conduct field monitoring - field crew member 2	Sr. Env. Scientist II	224	$125.00	$28,000.00
Vehicle mileage		2500	$0.55	$1,375.00
Lodging		30	$85.00	$2,550.00
Per diem		30	$29.00	$870.00
Lab analysis (incl. QA/QC samples)	Energy Labs @ cost	1	$7,052.00	$7,052.00
Lab analysis of biological samples	Rhithron @ cost	1	$28,080.00	$28,080.00
Field supplies and materials		1	$1,000.00	$1,000.00
Administrative support	Tech. Aide II	16	$50.00	$800.00
Task 9a Subtotal				**$98,287.00**
Task 9b. Data Formatting, Quality Control, and WQX	**Staff**	**Units**	**Unit Cost**	**Cost**
Data QA/QC review	Sr. Env. Scientist I	50	$85.00	$4,250.00
Data formatting & upload	Sr. Env. Scientist I	50	$85.00	$4,250.00
Administrative support	Tech. Aide II	16	$50.00	$800.00
Task 9b Subtotal				**$9,300.00**
Task 9 TOTAL				**$107,587.00**
PROJECT GRAND TOTAL				**$393,334.50**
				$209,732.26
			New $	**$183,602.24**